Combined Heat and Power in the Ethanol Industry

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Governors' Ethanol Coalition
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Overview

- What is the EPA CHP Partnership?
- What is CHP?
- Why CHP for ethanol production?
- EPA/DOE activities to advance CHP in the ethanol industry
- How States can help
- Where to go for more information

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EPA's CHP Partnership (CHPP)

- Voluntary public-private partnership, launched in 2001, to help get CHP projects installed
- 124 Partners today
  - States, CHP end-users, CHP developers, equipment manufacturers, utilities, energy service companies, NGOs, etc.
  - To date, 65 operational CHP projects (totaling over 850 MW) can be attributed to CHPP activities
- Key agencies: DOE, FEMP, HUD, USCHPA

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What Does the CHPP Do?

- Works closely with states to promote the environmental, economic, and energy benefits of CHP
- Helps Partners implement CHP projects
- Conducts targeted market development
- Works with DOE, USCHPA, Regional CHP Initiatives, CHP Application Centers, and State agencies to jointly implement efforts
- Recognizes CHP projects and Partners

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Why Combined Heat and Power?

- Smart on-site energy supply option for businesses in your state
  - Simultaneous generation of power and heat with primary and recycled energy
    - Uses energy for heat that is normally wasted in power generation
  - More efficient than grid power and on-site thermal
  - Reduces emissions
  - Saves money
  - Reliable
  - Improves power infrastructure

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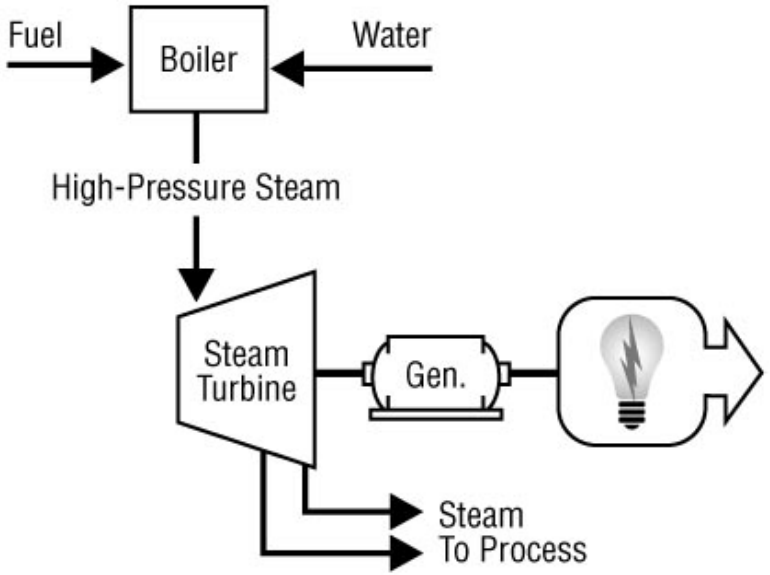
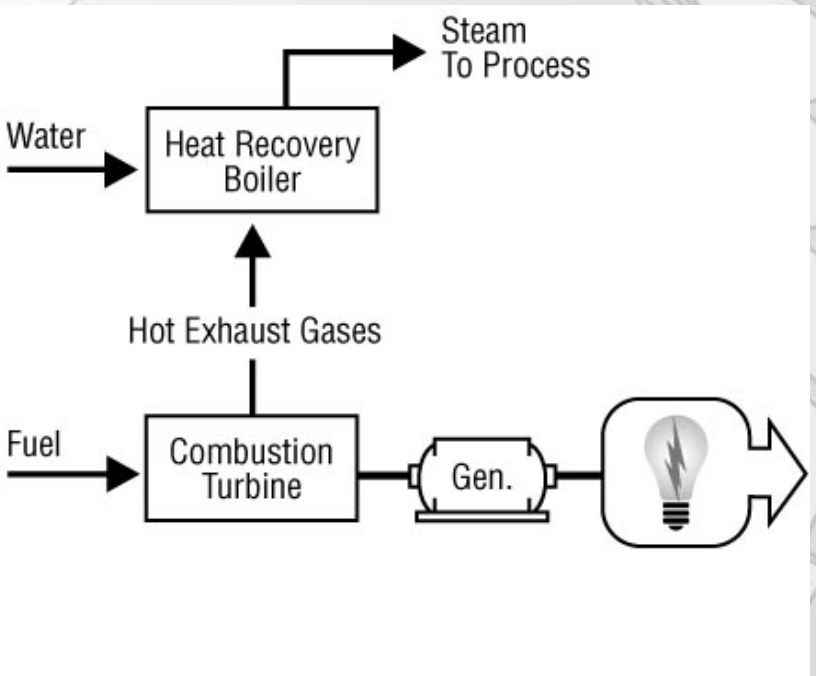
Typical CHP Systems

Steam Boiler/Steam Turbine:



Gas Turbine /Heat Recovery Unit:



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CHP Is a Viable Choice for the Ethanol Industry

- Large electric and steam demand appropriate for CHP
  - Typical CHP system would be 2 to 6 MW
  - Plants run 24/7 all year long
- Energy is a significant production cost in ethanol industry
  - Energy costs second only to cost of corn in dry mill ethanol plants
  - Grid power cost expected to increase in Midwest

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What Can CHP Offer the Ethanol Plant?

- Can yield energy cost savings from 10 to 25 percent
- Reliable electricity and steam generated on-site
- Reduced greenhouse gas emissions and other environmental impacts
- Hedge against unstable energy costs

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CHP Options for Ethanol Plants

- Existing gas/coal boiler - add steam turbine to generate electricity
- New plants
  - Gas turbine with waste heat boiler
  - Biomass boiler with steam turbine
- Thermal oxidizer
  - Waste-heat boiler produces CHP steam from oxidizer exhaust
  - Steam turbine produces electricity
- Integrate VOC destruction with CHP (currently being explored)

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CHP at U.S. Ethanol Plants

- U.S. Energy Partners, LLC, Russell, Kansas
  - Joint project between the municipal utility and the ethanol plant
  - Russell's two gas turbines generate 15 MW; 3 MW are sold to the ethanol plant, 12 MW are used by the utility
  - Turbine exhaust produces 64,000 lbs/hr of steam for the processes at the plant
- CHP on line at two other plants
  - Northeast Missouri Grain, LLC, Macon, Missouri – 10 MW gas turbine
  - Adkins Energy, LLC, Lena, Illinois – 5 MW gas turbine
- Plant under construction, Ashton, Iowa – 7 MW gas turbine
- Under consideration for many more plants in planning stages
  - Increasing interest in biomass CHP

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Challenges to Implementing CHP in the Ethanol Industry

- Unfamiliarity with technologies
- Not normally offered by energy suppliers
- Lack of capital
- Utility practices (e.g., interconnection requirements)
- Questions about permitting
- Concern about natural gas prices
- Other pressing priorities

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EPA and DOE Are Helping Advance CHP in the Ethanol Industry

- Evaluated environmental, economic, and energy benefits of CHP at ethanol plants
- Exploring potential to burn VOCs in CHP system
- Developing educational materials
- Holding workshops for ethanol industry (e.g., Iowa in Spring 2004, with MW CHP Application Center)
- Visiting and networking with plants, developers, and other key players

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How Can States Help?

- Identify opportunities for public utilities commissions to establish rules for fair treatment of CHP by utilities
- Adopt emissions limits on an output basis to account for the efficiency of CHP
- Work with the EPA Partnership to learn what other states are doing
- CHPP already working closely with State Partners
  - e.g., IA, IL, IN, MI, MN, OH, WI

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Conclusions

- CHP is technically a feasible choice for the ethanol industry
- CHP is more efficient than conventional separate electric and thermal generation
  - Efficiency yields cost savings and achieves environmental benefits
- CHP benefits the consumer, the state, and the environment
- Organizations are at work to help the ethanol industry implement CHP
  - EPA's CHPP
  - DOE/ MW CHP Application Center

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For More Information

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